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## GEOMETRY.

Solutions of Problem 210 have been received from J. E. Sanders, Hackney, O.; Charles E. Barrett, Anchorage, Ky., and Charles A. Carpenter, Student in Adelphi Academy, Brooklyn, N. Y.

Solutions of Problem 211 have been received from J. E. Sanders, Hackney, O., and John D. Cutter, Student in Adelphi College, Brooklyn, N. Y.

174. Proposed by B. F. FINKEL, A. M., 204 St. Marks Square, Philadelphia, Pa.

Given two triangles  $ABC$  and  $A'B'C'$  lying in the same plane. The side  $B'C'$  cuts the sides  $AC$ ,  $BC$ , and  $AB$  in the points  $I$ ,  $H$ , and  $G$ , respectively; the side  $A'B'$  cuts the sides  $AC$ ,  $BC$ , and  $AB$  in  $D$ ,  $F$ , and  $E$ , respectively; and  $A'C'$  cuts  $AC$ ,  $BC$ , and  $AB$  in  $M$ ,  $L$ , and  $K$ , respectively. Prove that

$$(DA'.EA'.AF')(GB'.HB'.BI')(MC'.LC'.CK) \\ = -(KA'.AL.A'M)(FB'.BE.B'D)(IC'.CH.CG).$$

Solution by G. W. GREENWOOD, A. M. (Oxon), Professor of Mathematics and Astronomy in McKendree College, Lebanon, Ill.

Since  $AC$  is a transversal cutting the sides  $A'B'$ ,  $B'C'$ ,  $C'A'$  of the triangle  $A'B'C'$  in the points  $D$ ,  $I$ ,  $M$ , respectively, we have, by the theorem of Menelaus,

$$A'D.B'I.C'M = -B'D.C'I.A'M.$$

Writing down the corresponding results for the other transversals, we get, by multiplying, the result required.

Also solved by G. B. M. Zerr, A. M., Ph. D., Parsons, W. Va.

213. Proposed by H. F. MacNEISH, University High School, Chicago, Ill.

Construct an equilateral triangle which shall have its vertices in three given parallel lines.

Remark by G. I. HOPKINS, Manchester, N. H.

The solution follows easily from the solution of Geometry Problem number 156 in the MONTHLY for November, 1901.

Independent solutions have been received from R. A. Wells, Bellevue, Neb.; G. W. Greenwood, Lebanon, Ill.; G. B. M. Zerr, Parsons, W. Va.; A. H. Holmes, Brunswick, Maine, and the Proposer.

214. Proposed by H. F. MacNEISH, A. B., University High School, Chicago, Ill.

Inscribe in a given circle a triangle whose sides shall pass through three given points.

Solution by G. W. GREENWOOD, B. A. (Oxon), Professor of Mathematics and Astronomy, McKendree College, Lebanon, Ill.

Denote the fixed points by  $X$ ,  $Y$ ,  $Z$ . Take on the circle any number of points  $A_1$ ,  $A_2$ , ..... Draw  $A_1X$  cutting the circle again in  $B_1$ ; draw  $B_1Y$  cutting the circle again in  $C_1$ ; draw  $C_1Z$  cutting the circle again in  $D_1$ .

Perform the same operation with  $A_2$ , ..... thus determining the points  $D_2$ , ..... The ranges  $A_1$ ,  $A_2$ , .....  $D_1$ ,  $D_2$ , ..... are homographic. Construct their double points which will give two (real or imaginary) positions of a point  $A$  with which  $D$  will coincide.